REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow.

No claims are currently being amended. Claims 1-13 remain pending in this application, of which claims 6-13 are withdrawn from consideration.

Rejection under 35 U.S.C. § 103

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,713,216 to Higashi et al. (hereafter "Higashi"). Applicants respectfully traverse this rejection for at least the following reasons.

Applicants submit herewith a Declaration under 37 CFR 1.132 from Zuoren Nie, one of the inventors of the present application, in support of the patentability of independent claim 1, and the dependent claims depending therefrom.

Claim 1 recites an aluminum alloy consisting essentially of Zn, Mg, Er as the main alloying elements, the remainder of Al, and incidental impurities. Thus, in claim 1, the Al-Zn-Mg alloy also includes the rare earth Er. Although Higashi discloses a number of rare elements, including Er, that may be added to its alloy, Higashi discloses preferably that one or two elements selected from Y, La, Ce, Pr, Nd and Sm are used (col. 2, lines 36-37), and does not provide any alloy examples with Er as the rare earth element, much less only Er. In contrast to claim 1, Higashi fails to disclose an aluminum alloy consisting essentially of Zn, Mg, Er as the main alloying elements, the remainder of Al, and incidental impurities. Moreover, claim 1 is not obvious over Higashi in that Higashi does not recognize any advantage using essentially only Er in conjunction with Zn and Mg as the main alloying elements in an aluminum alloy, much less for improving the strength of the alloy.

The Office Action states with respect to Higashi: "Higashi teaches an Al-Zn-Mg alloy with added rare earth such as Er (column 2 line 32), which is effective to enhance the strength of said alloy." Higashi, however, does not disclose that the addition of rare earth elements to an Al-Zn-Mg alloy would increase its strength. Higashi teaches that rare earth elements are conducive to improving the resistance to stress corrosion with additional benefits of

improving the hot extrusibility and malleability (Declaration, ¶ 8). Stress corrosion, however, is not strength. Strength means the ability of alloys to resist deformation or rupture, normally measured in force per unit area, and can be very different from the properties of stress corrosion (Declaration, ¶ 8). Higashi suggests that addition of rare earth elements would not increase, or may even lower, the strength of Al-Zn-Mg alloys as shown by comparing the strength of the rare earth containing alloys 1-10 and that of the comparative alloys 16-17 in TABLE (3) of Higashi (Declaration, ¶ 8). Higashi discloses improving the strength of the Al-Zn-Mg alloy only by the addition of Zn and Mg (see Higashi, col. 2, lines 9-10, 17-18), not Er or any other rare earth element.

Moreover, one skilled in the art would not have looked to Er as an additive to strengthen Al-Zn-Mg alloys, because rare earth elements at the time of the present invention, were not generally known for strengthening such alloys. Research, before the present invention, had been directed to increasing the strength of Al-Zn-Mg alloys, and different elements, including rare earth elements, were found to have varying effects on strengthening Al-Zn-Mg alloys (Declaration, ¶ 9). For example, Yi-Lei Wu et al.,[1] studied the influences of Sc, Ni and Ce on Al-Zn-Mg-Cu alloys and came to the conclusion that Sc provides the highest increase in the strength of the alloy, while Ce has little strengthening effect (Declaration, ¶ 9). Even for Sc, however, the increase in strength as shown by Yi-Lei Wu is only about 6% (Declaration, ¶ 9).

By contrast with the effect of rare earth elements on the strength of Al-Zn-Mg alloys as known at the time of the present invention, the inventors of the present application, unexpectedly discovered that Er could dramatically increase the strength of Al-Zn-Mg alloy, even to an extent of strengthening by more than 20% with the toughness substantially unchanged compared to an alloy without Er (see table 3 of the present Application, Declaration, ¶ 10). Such a large increase in strength (more than 20%) would not have been expected by a person of ordinary skill in the art at the time of the present invention (Declaration, ¶ 10).

[1] Yi-Lei Wu et al., "Microalloying of Sc, Ni, and Ce in an Advanced Al-Zn-Mg-Cu Alloy", Metallurgical and Materials Transactions A, Vol. 30A, April, 1999, pp. 1017-1024.

During research for the present invention, the inventors of the present application also investigated the effects of the rare earth elements Nd and Gd on the strength of Al-Zn-Mg alloy, and found such elements lowered the strength as well as the toughness of the Al-Zn-Mg alloy (Declaration, ¶ 11). Based on the known state of the art at the time of the present invention, a person of ordinary skill in the art would have come to a conclusion that different rare earth elements have different effects on the strength of Al-Zn-Mg alloy, and that few rare earth elements would be recognized as strengthening Al-Zn-Mg alloy (Declaration, ¶ 11).

At the time of the present invention, a person of ordinary skill in the art would have recognized that Higashi merely teaches that rare earth elements are conducive to improving the resistance to stress corrosion with the additional benefit of improving hot extrusibility and malleability, but that Higashi does not disclose the effect of rare earth elements on increasing the strength of Al-Zn-Mg alloy (Declaration, ¶ 12). In fact, a person of ordinary skill in the art would have understood the Higashi disclosure as suggesting that in fact the addition of certain rare earth elements lowers the strength of Al-Zn-Mg alloy based on the comparison of the tensile strength of Al-Zn-Mg alloys containing rare earth elements with that of Al-Zn-Mg alloys containing no rare earth elements in TABLE (3) of the Higashi disclosure (Declaration, ¶ 12). A person of ordinary skill in the art at the time of the present invention, based on the disclosure of Higashi, would not have recognized that Er could increase the strength of Al-Zn-Mg alloy, especially to such a great extent of over 20% (Declaration, ¶ 12).

The Office Action cites to Higashi at col. 2, lines 40-42 as teaching that the rare earth elements are recognized equivalents. Applicants note, however, the Higashi does not suggest that the rare earth elements are equivalent for improving the strength of Al-Zn-Mg alloys, much less that Er in particular provides an unexpected increase in such strength.

In sum, Higashi does not recognize the unexpected increase in strength of Al-Zn-Mg alloy provided by the addition of Er, and claim 1 is patentable over Higashi for at least this reason.

The dependent claims under consideration, 2-5, are allowable for at least the same reasons as claim 1, from which they ultimately depend, as well as for further patentable features recited therein.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is believed that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By

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